

GOOGLE MOTION CHARTS WITH R

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5 October 2010, LondonR

Disclaimer

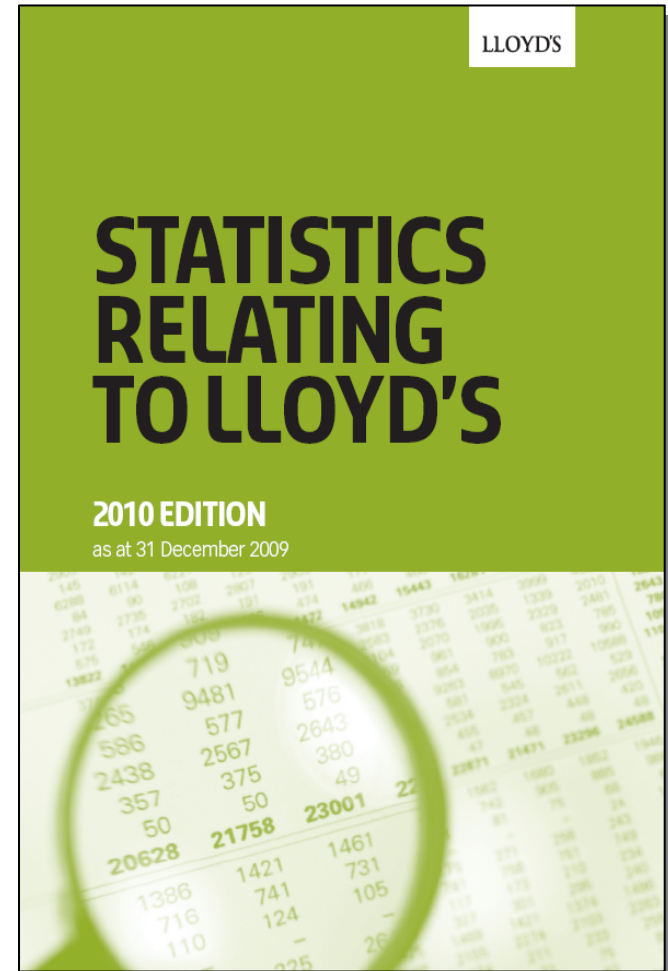
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Agenda

- Motivation
- Google Motion Charts
- Google Motion Chart R package
 - `googleVis`
- Case study

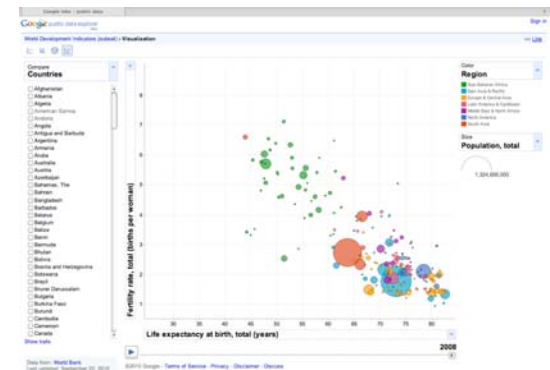
Motivation

- Lloyd's started to published the 'Statistics relating to Lloyd's' in 2010
 - Summary of market statistics
 - P&L and balance sheet information by syndicate
 - Underlying data available
 - Online: www.lloyds.com/stats
- **How can we bring the data to life?**

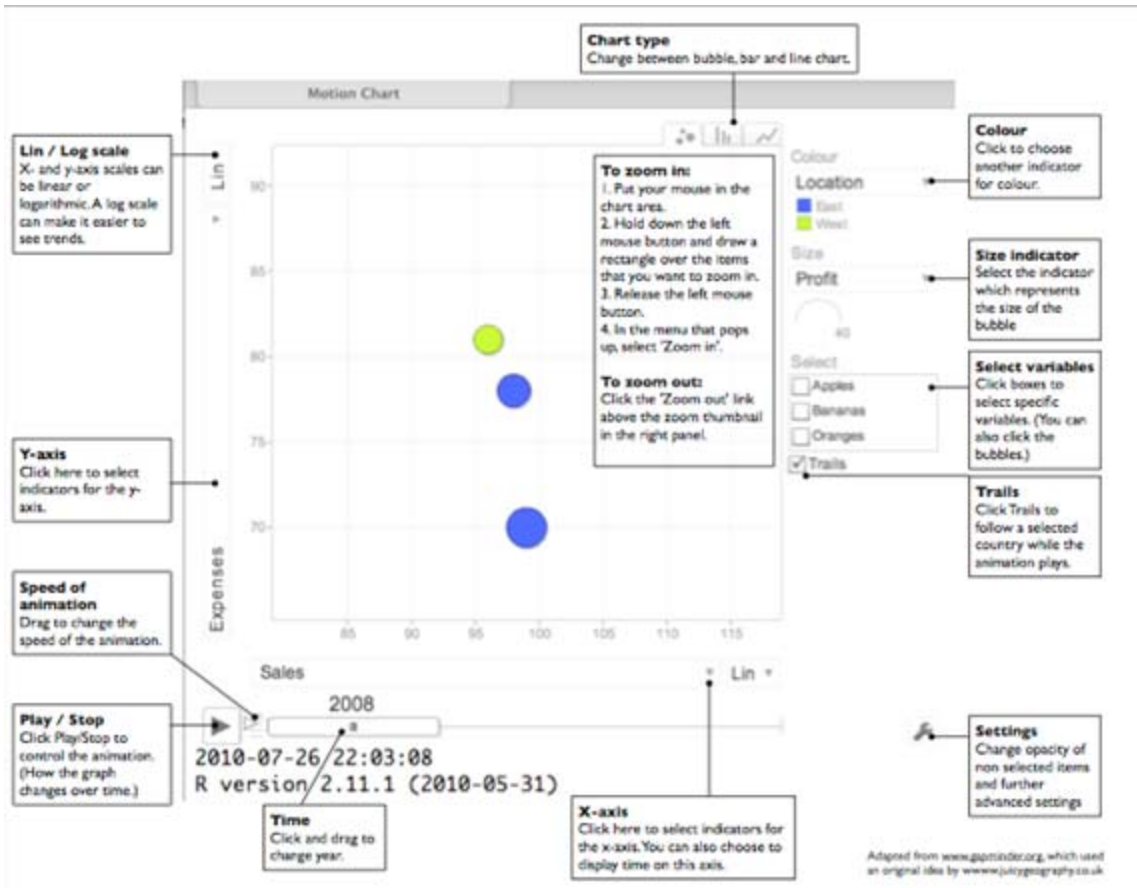


Motion charts

- Popularized by Hans Rosling (Gapminder)
 - TED talk: [Hans Rosling shows the best stats you've ever seen](#)
 - [Google Open Data Explorer](#)
 - Access to public data
- Talk on Motion Charts by Sebastián Pérez Saaibi at Remetrics 2010 and BaselR July 2010
 - [Visualization of multivariate data over time](#)



Google Motion Chart GUI

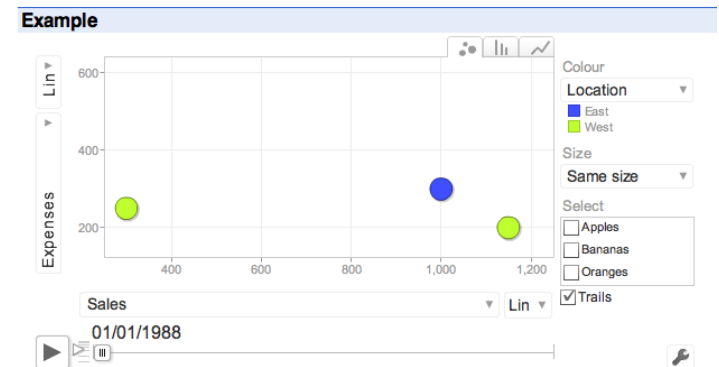


- A dynamic chart to explore several indicators over time.
- The chart is rendered within the browser using Flash.

Google Motion Chart Api - Example

```
<html>
<head>
  <script type="text/javascript" src="http://www.google.com/jsapi"></script>
  <script type="text/javascript">
    google.load('visualization', '1', {'packages':['motionchart']});
    google.setOnLoadCallback(drawChart);
    function drawChart() {
      var data = new google.visualization.DataTable();
      data.addColumn('string', 'Fruit');
      data.addColumn('date', 'Date');
      data.addColumn('number', 'Sales');
      data.addColumn('number', 'Expenses');
      data.addColumn('string', 'Location');
      data.addRows([
        ['Apples',new Date (1988,0,1),1000,300,'East'],
        ['Oranges',new Date (1988,0,1),1150,200,'West'],
        ['Bananas',new Date (1988,0,1),300,250,'West'],
        ['Apples',new Date (1989,6,1),1200,400,'East'],
        ['Oranges',new Date (1989,6,1),750,150,'West'],
        ['Bananas',new Date (1989,6,1),788,617,'West']
      ]);
      var chart = new
google.visualization.MotionChart(document.getElementById('chart_div'));
      chart.draw(data, {width: 600, height:300});
    }
  </script>
</head>

<body>
  <div id="chart_div" style="width: 600px; height: 300px;"></div>
</body>
</html>
```



Source: <http://code.google.com/apis/visualization/documentation/gallery/motionchart.html>

Google Motion Charts with R

- Project web site: <http://code.google.com/p/google-motion-charts-with-r/>
- Current authors:
 - Markus Gesmann
 - Diego de Castillo
- Contributors are welcome!
- Not on CRAN yet.

google-motion-charts-with-r
Visualising R data.frames with the Google Motion Chart API

Project Home | Downloads | Wiki | Issues | Source
Summary | Updates | People

- Overview
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Overview

GoogleMotionChart is an R package providing an interface between R and the Google Visualisation API.

The GoogleMotionChart package for R provides functions which allow the user to transform data stored in a R data.frame structure into a Google Motion Chart.

The output is html code, which when run on a web server, generates a dynamic flash based bubble chart to explore several indicators over time.

Here is an example of a Motion Chart based on a [Google Spreadsheet](#)

Suppose you would like to achieve the same result without uploading your data to a Google Spreadsheet. Using R and the GoogleMotionChart package you can achieve this. The function MotionChartPage generates the motion chart locally without sending any data to Google or any other server. This is how it works:

```
require(GoogleMotionChart)
Fruits ## Sample Data
MotionChartPage(Fruits, idvar="Fruit", timevar="Year", file="myFruitAnalysis.rsp")
```

The output file contains all the data and a reference to the Google Visualisation API. The actual Flash chart is rendered within the browser.

The screenshot shows a web browser window displaying a Google Motion Chart. The chart is a bubble chart with three data points: a blue bubble at approximately (2008, 10), a green bubble at approximately (2009, 20), and a purple bubble at approximately (2010, 10). The x-axis is labeled 'Year' and the y-axis is labeled 'Value'. The interface includes a 'Chart type' dropdown menu, a 'Customize' panel on the right with various options like 'Show legend', 'Show indicators', and 'Show variables', and a 'Settings' panel at the bottom right. The chart is rendered within a browser window, and the interface is in English.

Google Motion Chart R package

- Idea: Create wrapper functions which take a `data.frame` and produce html output following the Motion Chart API
- Display html output via web server
 - Use `R.rsp` package by Henrik Bengtsson
 - R Server Pages and Light-weight HTTP daemon (server).

Current functions

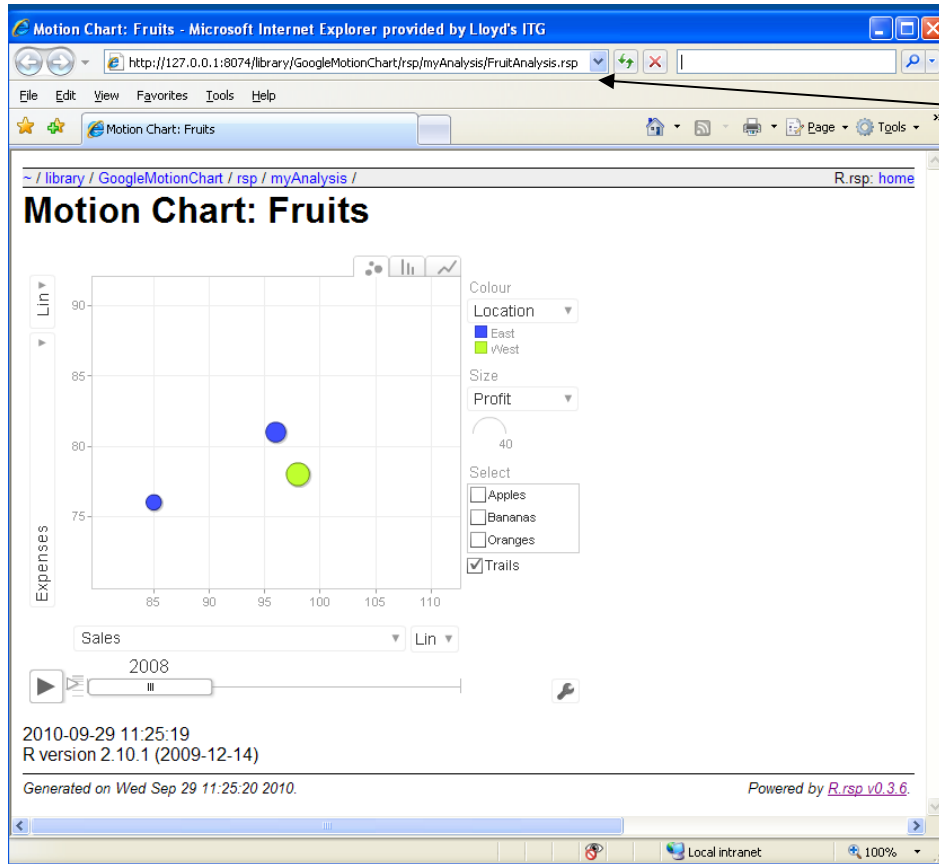
- Current package version 0.1.2 provides two functions
- **MotionChart**
 - Produces core html output
- **MotionChartPage**
 - Produces complete html page
- Input data requires data frame with an 'idvar' and 'timevar'
- Combination of 'idvar' and 'timevar' gives a unique row

Example data set

> Fruits

	Fruit	Year	Location	Sales	Expenses	Profit	Date
1	Apples	2008	West	98	78	20	2008-12-31
2	Apples	2009	West	111	79	32	2009-12-31
3	Apples	2010	West	89	76	13	2010-12-31
4	Oranges	2008	East	96	81	15	2008-12-31
5	Bananas	2008	East	85	76	9	2008-12-31
6	Oranges	2009	East	93	80	13	2009-12-31
7	Bananas	2009	East	94	78	16	2009-12-31
8	Oranges	2010	East	98	91	7	2010-12-31
9	Bananas	2010	East	81	71	10	2010-12-31

Motion Chart Example



By default files are written into GoogleMotionChart library folder to be accessible by R.rsp

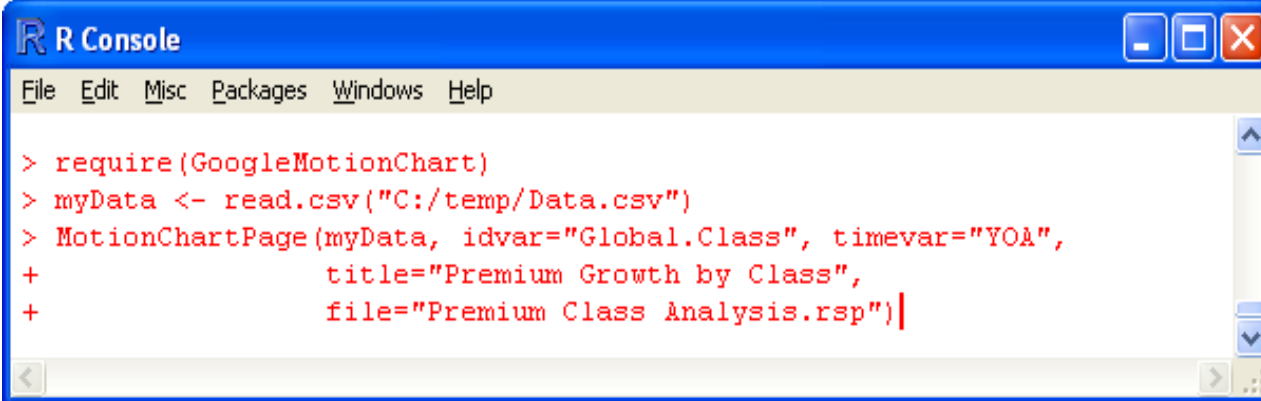
```
library(GoogleMotionChart)
MotionChartPage(Fruits, idvar="Fruit", timevar="Year", file="FruitAnalysis.rsp")
```

Next steps

- Develop package further. New name: **googleVis**
 - With a more generic framework
 - `gvisMotionChart`, `print.gvis`, `plot.givs`
 - Use of RJSONIO by Duncan Temple Lang from Omegahat
- Include further visualization APIs, such as
 - Table: `gvisTable`
 - Geo Map: `gvisGeoMap`
 - Tree Map: `gvisTreeMap`
- Publish on CRAN

Case Studies

- Typical Application of Motion Charts in Business Environment:
 - Large Amounts of Data can be analysed visually
 - Various Measures can be compared simultaneously
 - Historic Development is visible
 - Outliers and exceptional performers can be identified easily
- Typical Code Snippet to create charts:

A screenshot of an R Console window. The window has a blue title bar with the R logo and the text "R Console". Below the title bar is a menu bar with "File", "Edit", "Misc", "Packages", "Windows", and "Help". The main area of the window contains R code in red text on a white background. The code is as follows:

```
> require(GoogleMotionChart)
> myData <- read.csv("C:/temp/Data.csv")
> MotionChartPage(myData, idvar="Global.Class", timevar="YOA",
+                 title="Premium Growth by Class",
+                 file="Premium Class Analysis.rsp")
```

Case Study – Capacity by Class

LLOYD'S

THE WORLD'S LEADING INSURANCE MARKET

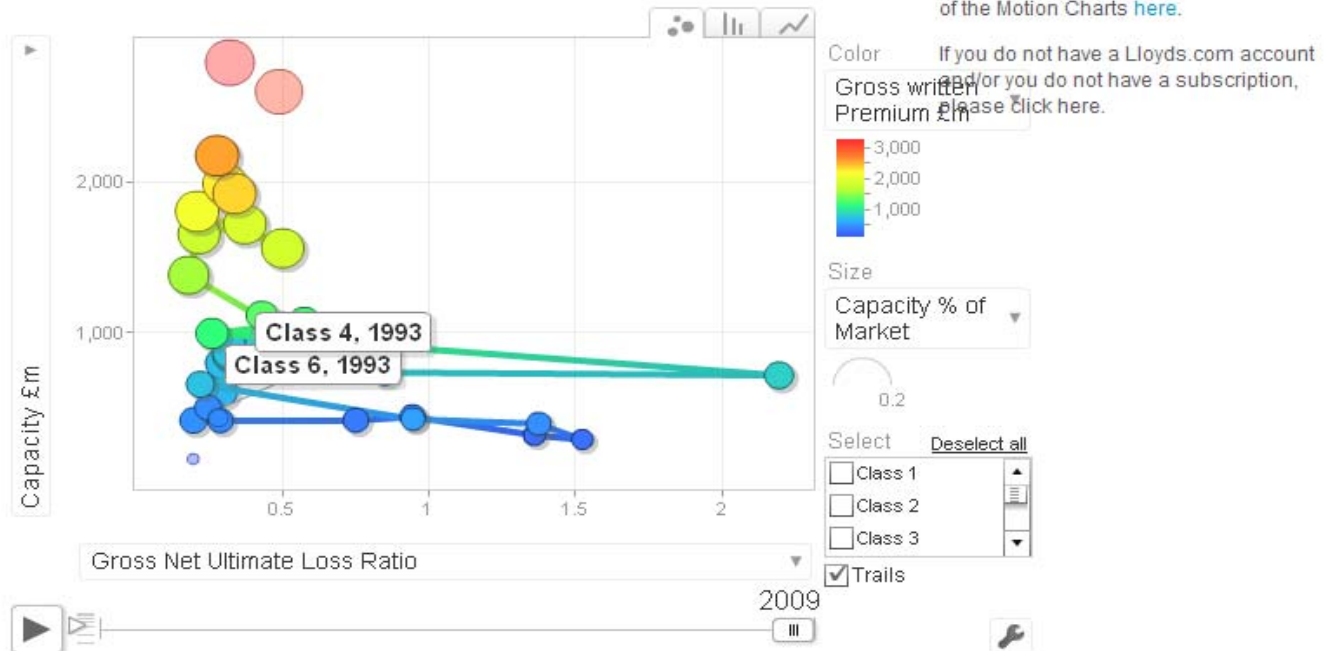
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CAPACITY SPLIT BY CLASS OF BUSINESS

The Motion chart below shows the overall market Capacity by year of account for Lloyd's high level classes of Business from 1993-2009 weighted as a percentage of the overall capacity in the market.

WANT TO ACCESS THE FULL VERSION?

If you have a Lloyds.com account and a valid subscription to Statistics Relating to Lloyd's, you can view the full versions of the Motion Charts [here](#).

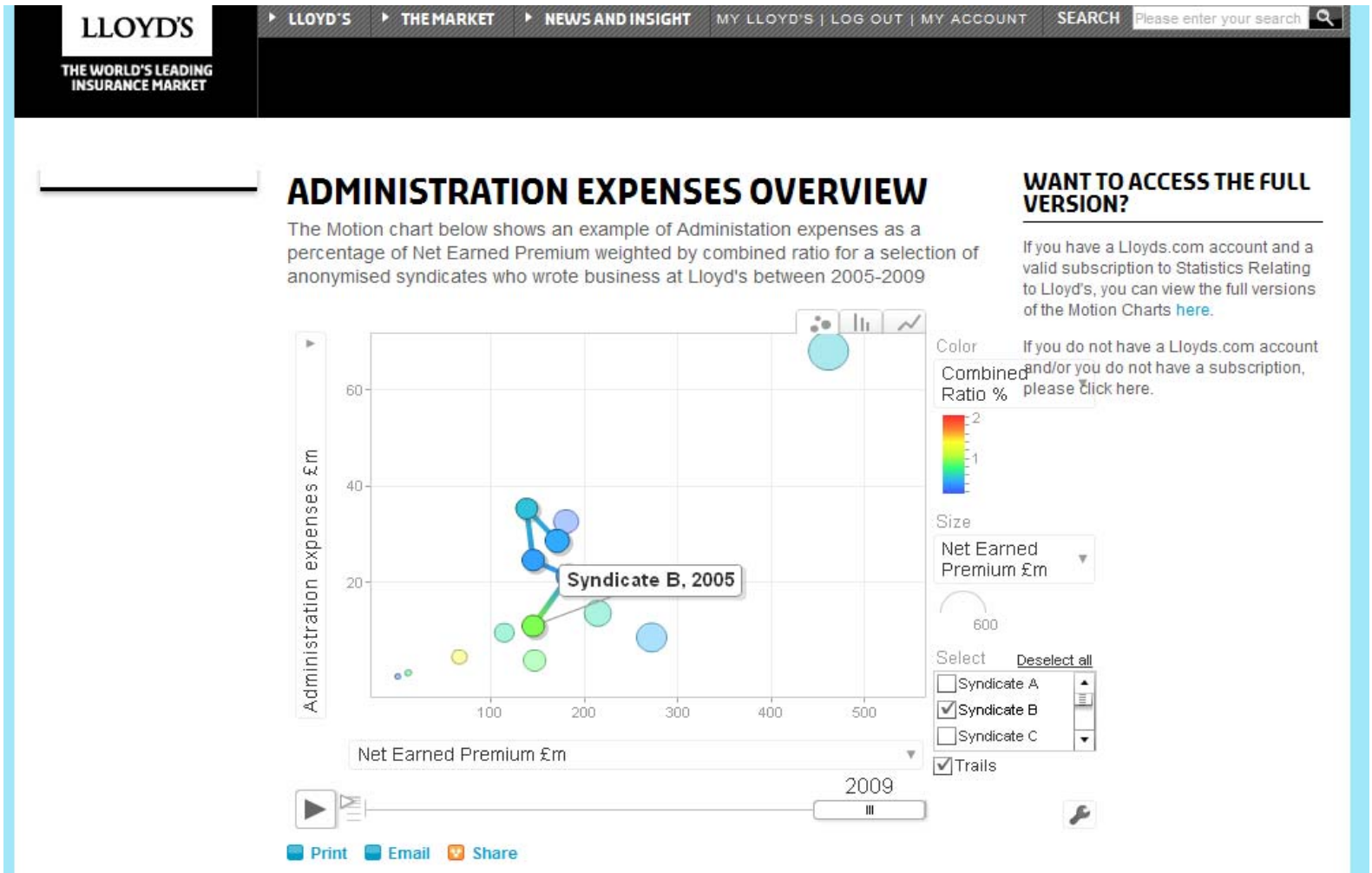


All figures are quoted in £GBP as at the relevant year end. No adjustment has been made for indexation.

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Dummy data for illustration purpose only.

Case Study – Expense Overview

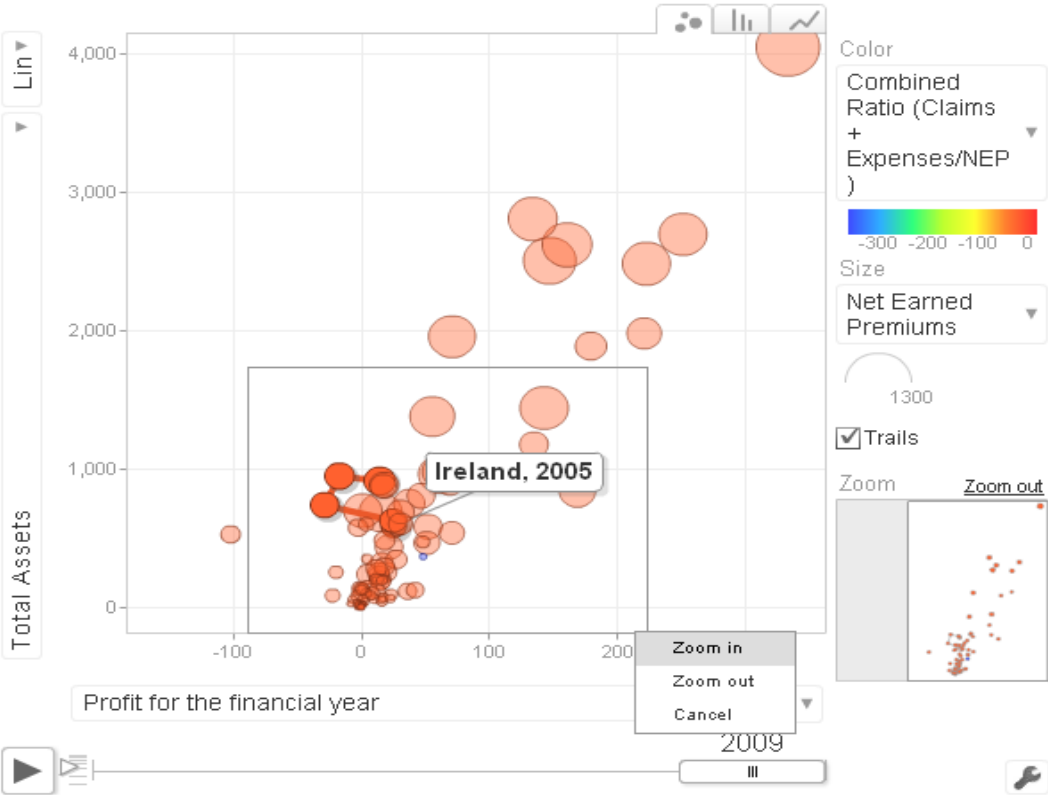


Dummy data for illustration purpose only.

Case Study – Annual Account Analysis

~/ library / GoogleMotionChart / rsp / myAnalysis /

Annual Accounts

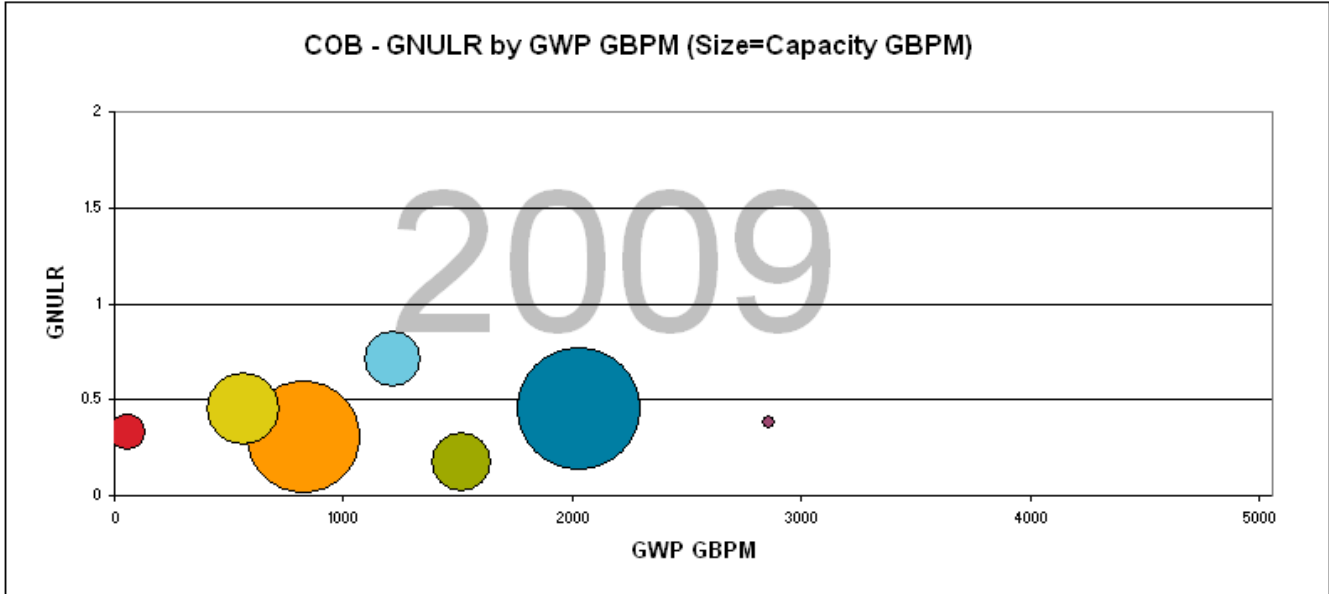


2010-09-30 14:03:17
R version 2.10.1 (2009-12-14)

Generated on Thu Sep 30 14:03:22 2010.

Dummy data for illustration purpose only.

Other Motion Chart Interfaces:



Y-Axis: GNULR
 X-Axis: GWP GBPM
 Bubble Size: Capacity GBPM
 Show Data Labels: Aviation, Casualty, Energy, Marine

Time: [Progress Bar] Play
 Hit Esc to Pause/Stop
 Faster: 20
 Smoother: 5
 Update Source: Update
 Change Chart: [Icons for different chart types]

Will be available from www.lloyds.com/stats soon.

Thanks.

- Any questions?